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A COMPARISON OF THE UNAIDED RECALLS OF ABLE AND LESS ABLE READERS

by

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Supervisor

Grace Malicky
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R. Mulgrew
.....

Date July 23, 1981

FOR

LIZ

AND JEFF AND TIM

WHO
SUFFERED
GLADLY

MY MOTHER

WHO
LIVED TO
SEE THE DAY

AND

MY FATHER

WHO WOULD
HAVE LIKED
TO

ABSTRACT

The purpose of this study was to investigate the nature of silent reading comprehension of able and less able readers. In order to accomplish this purpose, unaided, oral recall protocols were analysed and compared to the original text to determine whether able and less able readers differ in the quantity and quality of what they recall.

A sample of 32 grade six students was selected and dichotomized into two equal groups, able and less able readers, on the basis of their performance on the Edmonton Public Schools Reading Test and the Canadian Cognitive Abilities Test.

Each group member was asked to read a narrative selection silently and to tell the story back immediately after the reading. The unaided recalls were tape recorded, transcribed and analysed into clauses. These clausal units were then compared to the clausal units in the original text and assigned to categories based on that comparison. The category system used was that developed by Fagan (Appendix B).

Statistical treatment of the data included a two way analysis of variance with repeated measures on the recall categories and a t-test to determine whether able and less able readers differed significantly in the quantity of information recalled.

The findings indicated no significant differences between able and less able readers in the percentage of units falling into each of the five recall categories. There was no significant interaction between reading achievement groups and the percentage of

information in the recall categories. However, there were significant differences in the percentage of recall units in the recall categories. There was no significant difference between able and less able readers in the number of recall units identified in the recall protocols.

It was concluded that, with reading material that presents no difficulties with word identification or concepts, able and less able readers recall similar amounts and types of information.

Various factors which should be considered in planning future research using recall categories are presented in the suggestions for future research.

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Chapter I

THE PROBLEM

"Comprehension is the very heart of the reading act. There is no use in reading unless one understands the meanings. . . ." (Smith, 1977, p. 38). Various educators and researchers have attempted to delineate what comprehension includes. Many skills have been identified as enabling students to comprehend text. Smith and Barrett (1974) have developed a taxonomy which includes literal recognition or recall, inference, evaluation and appreciation as subskills involved in comprehension. However, studies are just beginning to delineate some of the processes which are in operation during reading comprehension.

Comprehension involves a reconstruction of meaning. Meaning is not in the text; but the text contains informational cues which the reader uses to reconstruct meaning by interpreting the cues in the light of his knowledge of language and his knowledge of the world (Fagan, 1978). The reconstruction of meaning depends upon various factors including: the nature of the informational cues in the next, the nature of the information possessed by the reader, and the ways in which these two interact.

Many ways have been used to assess reading comprehension including: teacher questions of various types, multiple choice questions and cloze procedure. Another method which investigators have used frequently is unaided, oral recall. The comprehension

product is given in the form of a free, or unaided, retelling on the part of the subject of what he has read. By analysing the transcript of this oral retelling, inferences can be made about which text cues the subject used, what information was added by the reader and how the two were combined to reconstruct meaning.

Standardized reading tests confirm what teachers long have known; some readers comprehend better and/or differently than others. Perhaps able readers differ from less able readers in the quantity and quality of the information they recall from their reading. An understanding of the ways in which able and less able readers differ when they comprehend could lead to better instructional practices.

Comparing the protocols of the oral, unaided recalls of able and less able readers could lead to inferences about the ways in which they differ when processing print. These protocols, as well as the text, could be analysed into units to determine the quantity of information recalled; the recall units, in turn, could be classified into different categories depending upon their relationship to the textual units. If the information recalled by able readers falls into the categories in different proportions than the recall information of less able readers, then processing differences can be inferred.

Many studies (Drum and Lantaff, 1977a, 1977b; Furniss, 1978; Tierney, Bridge and Cera, 1979; Zinn, 1978; Brake, 1981) have analysed reading passages and compared them to the verbal recalls of subjects following the reading. Most of these studies have categorized the units of recall into the categories proposed in the Drum and Lantaff study or into revisions of these categories. So

far, investigators have used propositions, basic t-units and alternate t-units as the unit of analysis. Also, much work has been done recently by Fagan (1978, 1980, in press) at the University of Alberta, to revise and refine Drum's original categories. The present study uses clauses as the unit of analysis and Fagan's (in press) revision of Drum's categories. Using these modifications, it is important to investigate whether and/or how able and less able readers differ in their oral recall of stories they have read.

Purpose of the Study

The purpose of the study is to investigate the nature of silent reading comprehension of able and less able readers. In order to accomplish this purpose, reading recall protocols will be analysed into units and these units categorized to determine the nature of the recall and its relationship to the text.

Definition of Terms

Reading Comprehension

A complex of processes involved in bringing meaning to the printed page and interacting with that written message in order to communicate with the author (McLeod, 1978).

Unaided Recall

The oral recall or retelling of a story after it has been read.

Recall Protocol

The verbatim transcript of the oral language output during the unaided recall.

Unit of Analysis

The unit of analysis in this study is the clause. The clause was chosen as the unit of analysis because it is of intermediate length between the proposition and the basic or alternate t-unit.

Able Readers

Those subjects in grade six who achieved above the 85th percentile on the comprehension section of the Edmonton Public School District's reading test, administered at the end of the previous school term.

Less Able Readers

Those subjects in grade six who achieved below the 30th percentile on the comprehension section of the Edmonton Public School District's reading test, administered at the end of the previous school year.

Recall Categories

These categories are text exact, text specific, text entailed, text experiential and text erroneous (Fagan, in press).

Category A: Text Exact

This category includes information from the text in its exact form or with minimal variations (p. 6).

Category B: Text Specific

This category includes information recalled that had specific references in the text. The reader may have "transformed" some of this information by reordering or substituting lexical items (p. 7).

Category C: Text Entailed

This category includes information which is retrieved as (a) a paraphrase of or synonymous with the information input, but the unit of recall includes information from more than one unit of input, or (b) a subordinate statement subsuming information from more than one text unit (p. 7).

Category D: Text Experiential

This category includes information added by the reader to fill in gaps in the text data (p. 8).

Category E: Text Erroneous

This category includes information which the reader has processed incorrectly, either at the time of comprehending or at production of the recall (p. 10).

Hypotheses

In order to achieve the purpose set out in this study the following null hypotheses were set and investigated.

Hypothesis 1

There will be no significant main effects or interaction for reading achievement groups or recall categories (text exact, text specific, text entailed, text experiential, text erroneous)

on the percentage of recall units.

Hypothesis 2

There will be no significant differences between able and less able readers in the number of recall units identified.

Limitations of the Study

When considering the results of this study, the following limitations should be observed:

1. When subjects were giving oral recalls, verbal facility may have affected the results of the study. Some subjects might have comprehended the passage when reading but might have been unable to verbalize their understanding. Others might not have comprehended as well when reading but, because of verbal facility, made the most of the information they did process.

2. Subjects participating in the study might not have been familiar with the oral retelling of a story and been unsure of how much or what parts they understood of the story to include in the oral retelling. Some subjects were unfamiliar with the unstructured nature of the oral retelling and seemed, initially, to miss the structure of the teacher's questions as a guide to their remembering. Also, the presence of the tape recorder may have affected the performance of some subjects.

3. The reading test used to identify able and less able readers was one developed by the Edmonton Public School District and might not discriminate able readers from the less able as well

as other standardized tests. Also, the scores used were from the end of the previous school year. Some students' comprehension scores might have changed in the ensuing ten months.

Significance of the Study

Since the focus of this study is on how able and less able readers comprehend, it will add to our theoretical knowledge about the comprehension process. Also, it will indicate whether or not able and less able readers differ in the quantity and quality of what they recall from their reading. This information would be of value to classroom teachers, resource room teachers and reading clinicians and has implications for further research. The study should also reveal further evidence about the utility of unaided recall as a measure of silent reading comprehension.

Plan of Investigation

This investigation is reported according to the following plan:

Chapter 2 reviews the related literature and research.

Chapter 3 reports the experimental design of the study.

Chapter 4 provides an analysis and discussion of the results.

Chapter 5 presents a summary of the study, major findings and conclusions, implications of the study for the classroom and suggestions for further research.

Chapter II

RELATED LITERATURE

The main purpose of this study is to investigate the nature of silent reading comprehension of able and less able readers. Specifically, the study compares unaided, oral recall to the original text to see whether or not able and less able readers differ in the quantity and quality of the information they recall after reading.

This chapter will provide a review of the literature related to this purpose. The chapter is divided into three sections. The first section deals with studies which have used unaided, oral recall as a reflection of silent reading comprehension. The second section deals with recall studies which have used recall categories as a method of comparing recall protocols to the original text. The third section deals with recall studies using recall categories to investigate quantitative and qualitative differences in the oral recalls of able and less able readers.

Recall as a Reflection of Reading Comprehension

Few people would disagree that the main purpose of reading is to comprehend what is read. However, although comprehension is easy for most readers to accomplish, it is a difficult process to investigate because it is a covert process, private to the individual.

Fredericksen (1975) defines the comprehension process well when he states:

> Understanding may be regarded as a process whereby a listener or reader attempts to infer the knowledge structure of a speaker or writer by using the available linguistic message, contextual information, and his own knowledge store as "data structures" from which the inference is to be made. (p. 371)

In order to investigate this complex process it is necessary to examine the product of comprehension in order to make inferences about the mental processes involved. Various comprehension products have been used by investigators to get at the comprehension process including: recognition of content, probing questions, multiple choice questions, cloze procedure, etc. Another method which has been used is unaided, oral recall.

Tierney, Bridge and Cera (1979) state that by analysing a passage and comparing it to the verbal recall of a subject, the nature of a reader's organizing procedures can be ascertained. They point out that recall of text involves abstractive and constructive processes. Abstractive processing involves selecting relevant ideas or summaries of ideas from text to be handled by the memory system. Constructive processing involves relating the information from the text to information already possessed by the reader in order to construct a meaningful interpretation.

The recall of readers, then, is a response to text which is interactive with what the text says and what the reader already knows. The recall of a reader does not represent everything that a reader can remember from the text; what it does represent is the gist of the text. Recall is not only a verbatim response but may also include a reconstruction based upon a selection and rearrangement of items into a summary of the text. The rearrangement and integration of

the items depends upon the reader's prior knowledge, his expectations of what he is about to read, the wording of the text and the reader's ability to interrelate items within and across sentences and paragraphs.

This product of reading comprehension, unaided recall, can be compared to the original text to determine the quantity and quality of the information recalled. Researchers have developed various ways of analysing recall protocols and text in order to make such comparisons.

Bartlett (1932), studying readers' recalls of stories from different cultures, discovered that readers have schemas for what stories are like and that these schemas account for some of the reconstruction that takes place in recall. These schemas are used, during retrieval, as cues to reconstruct what might have happened when a reader cannot recall specific information. However, Bartlett did not have a system of analysing text or recall protocols in order to make comparisons.

Researchers in the 1970's began to devise systems for making such comparisons. Mandler and Johnson (1977) further developed the concept of story schemas which they define as idealized, internal representations of parts of a typical story and the relationships between these parts. They found, by analysing text and recall protocols into story schemas, that readers use these schemas to guide comprehension during encoding and as retrieval mechanisms for recall.

Kintsch (1978) analysed text and recall protocols into hierarchically organized propositions and compared the recall

propositions to those in the original text. He found that recall involves reproduction, transformation and reconstruction. Reproduction involves practically verbatim recall of text propositions. Transformation involves changing text propositions by reordering, explicating, using lexical substitutions and changing perspective and thus can be a source of error. Reconstruction, Kintsch found, involves making inferences based upon prior knowledge and text information the reader could retrieve when the specific text information required was not available for retrieval. He found that recall included not only information from the text but also comments about its structure, content and schema, and the opinions and attitudes of the reader.

Fredericksen (1975) also developed a framework for analysing texts and recalls. His system of relationships supposedly paralleled the structure of memory. Fredericksen's work, as well as the others mentioned, all appear to be chiefly concerned with an analysis of text and only secondarily with the recall of readers. A fourth system for analysing and comparing text and recall protocols was devised by Drum and Lantaff (1977a, 1977b) who take into account many of the findings of previous research.

Drum and Lantaff's system also involves analysing both the text and the recall of the reader, but the focus changes from analysing text and using it as a template for evaluating recalls to a focus upon the reader's production. Drum and Lantaff state that production involves an integration of fragments in the text with a generalized knowledge of the world possessed by the reader. Drum and

Lantaff analysed both the text and the recall into propositions. These analyses are then compared to see where the reader's construction differs from the original text in terms of the quantity and quality of information.

In order to determine in what manner the recall differs from the text, the recall propositions are categorized into one of five categories based upon their relationship to those in the text. The five recall categories used by Drum and Lantaff are: text specific recall, text entailed recall, text elicited recall, text evoked recall and text external recall (Drum and Lantaff, 1977a). These categories represent a continuum from those closely related to text (text specific), and therefore representing strong textual influence, to those which are relatively unrelated to text (text external), and therefore representing strong experiential influence. These categories appear to be one way of investigating the nature of unaided recall and of understanding what happens during comprehension during the time of written language input and oral language output.

Since the initial work of Drum and Lantaff, Fagan (1979, 1980, in press) has continued to modify and refine the original categories and to suggest other units for analysing text and recall (Fagan, 1978, in press). The most recent list and description of the recall categories is the one used in this study and it is included in Appendix B.

Studies Using Categories to Analyse Unaided Recall

Some researchers have used Drum and Lantaff's categories, or revisions and modifications of those categories, as a method of

comparing recall to original text in their investigations of reading comprehension. Categorizing recalls into comprehension categories is believed to be one method of analysing how readers differ in both the quantity and quality of what they recall.[1]

Using two reading passages which differed in content and structure, Furniss (1978) analysed the unaided recall protocols of 140 proficient grade six readers into propositions and assigned those propositions to four of Drum's categories—text specific recall, text entailed recall, text evoked recall and text external recall. Her findings indicate that sixth grade readers recall proportionately more propositions from story narrative than from descriptive informational passages but that text structure did not significantly affect the proportions of propositions recalled in the recall categories.

Malicky and Beebe (in press) conducted a study with low reading achievers. They compared reading gains made by good and poor gainers while receiving remedial instruction at the University of Alberta Reading and Language Centre. Using Fagan's (1978) procedures for analysing children's oral language into t-units and alternate t-units, these researchers analysed pretest and postest recall protocols for 28 students. These units were then categorized into the four recall categories used by Furniss. Malicky and Beebe found that students who produced pretest recalls that showed a high proportion of inferential information appeared to benefit more from remedial

---

1. The category systems used in the studies reported here are not necessarily comparable as some definitions have changed. The version used in this study was Fagan (in press).

instruction than did those with a low proportion of this type of recall. They found that low gainers gave more erroneous and irrelevant information (text evoked) during pretest than did the high gain group, but there was some shift away from this type of information following remediation. High gainers decreased in the proportion of text specific information and increased in the proportion of text entailed information following remediation. The low gainers produced more text specific information following remediation as well as increased the proportion of text entailed information. Malicky and Beebe noted that an increase, after remediation, in text specific information did not result in an increase in reading achievement. In fact, those students who substantially decreased the use of text specific information made the greatest gains.

Beebe, Fagan and Malicky (1981) investigated the nature of the unaided recall of 74 grade four students. The comprehension level of each student was assessed to ensure that he could comprehend the narrative selection used in the study. Both the text and the recall protocols were analysed into clausal units (Fagan, in press) and each clause was assigned to a recall category (Fagan, 1979). Subsequent to coding the data, these researchers found that students did not use the text experiential category and that all of the clauses in the text external category were storytelling conventions. Therefore, these categories were not used in further analysis. The findings indicate that the amount of verbatim and integrated information given during recall is positively correlated with the

ability to comprehend and that the amount of erroneous information was negatively related. The correlation between verbatim information and integrated information is high and positive indicating that students who gave a lot of verbatim information also gave a lot of integrated information. Furthermore, these researchers state that the amount of verbatim information recalled is not important for itself but is important in terms of what the reader does with it.

Studies Using Categories to Compare High and Low Reading Achievers

The studies quoted above indicate that there are some quantitative and qualitative differences in the oral recalls of students which can be identified using recall categories. Perhaps these recall categories can indicate differences between high and low reading achievement groups. If so, there would be many useful implications for classroom instruction. This section will review studies which have used recall categories to investigate the differences in the recalls of high and low reading achievers.

Realizing that readers differ in their ability to recall what they read, Drum and Lantaff (1977b) investigated whether their categorization system would be a method of measuring these differences. Therefore, using a sample of 16 grade eight readers, 8 able readers and 8 below average readers, they compared the recall protocols of each group with the original, non-narrative passages. Their findings indicate that able readers remember more text specific and text entailed information, have more text external comments and recall less elicited and evoked information than do below average readers.

They also found that able readers were more likely to bring together information from all parts of the story, to make more text derived inferences and to add case-linked arguments than were below average readers.

Zinn (1978) conducted a study to compare high and low reading achievement groups on their recall categories and their use of causal connectives. Zinn used a sample of 32 grade four students, equally divided into low and high achievement groups. The reading passages and oral recalls were divided into basic and alternate t-units (Fagan, 1978) and assigned to recall categories using Furniss' (1978) modification of Drum's categories. Zinn found that, on passages with connectives present, there were few differences between high and low achievement groups. However, she did find that the low group produced significantly more information in the text external category which included storytelling conventions, repetitions and false starts. A comparison of the means of each group supports Drum and Lantaff's study to the extent that the high group recalled proportionately more information in the text specific and text entailed categories than did the low group.

Brake (1981) investigated the nature of comprehension of high and low achieving grade two students when they read silently and orally. Relying on the work of Fagan (1978), Brake analysed the recall protocols of 20 high achieving and 20 low achieving grade two students into t-units and alternate t-units. Following this analysis, each unit was categorized into a modification of Drum's categories (Fagan, 1979). She found that there were no significant differences

between high and low achievement groups in the type of information produced in the recall categories. However, she did find significant differences between oral and silent reading on the text specific and text erroneous recall categories. While both high and low achievement groups read at a higher instructional level during silent reading, both groups tended to recall more text specific information following oral reading and tended to recall more text erroneous information following silent reading. Brake concluded that mode of reading has a more significant effect upon the information recalled from reading than does the reading achievement of the reader.

Summary

Comprehension is a complex process and difficult to investigate. Usually the product of comprehension is analysed in order to make inferences about the process. Unaided, oral recall has been used by many researchers as one type of comprehension product to be analysed. It is assumed that by analysing the original text and comparing it to an analysis of the reader's unaided recall, inferences can be made about the nature of the reader's organizing procedures in order to remember what he has read. The problem of how to analyse text and recall for comparison has been approached by various researchers (Kintsch, 1978; Mandler and Johnson, 1977; Fredericksen, 1975). These systems of analysis have focussed on an analysis of text and the use of it as a template to judge the recall protocols of readers.

A system of analysis, developed by Drum and Lantaff (1977a, 1977b), shifts the focus of attention away from the text and towards

the reader. Drum and Lantaff analyse the original text and the recall protocols into propositions and assign them to one of five recall categories.

Research using these recall categories has resulted in modifications to the unit of analysis (Fagan, 1978, in press; Zinn, 1978, Brake, 1981, Malicki and Beebe, in press) and to the categories (Furniss, 1978; Fagan, 1979, 1980, in press). The results of these investigations have shown that text structure does not affect the information in the recall categories (Furniss, 1978). Mode of reading, however, does have an effect on the quality of the information recalled (Brake, 1981). Furthermore, readers have a better chance of benefiting from remedial instruction if they have a higher proportion of units in the categories which represent inferential information (Malicki and Beebe, in press).

Since Drum and Lantaff (1977a, 1977b), the results of recall category studies which have investigated differences between high and low achievers on the quantity and quality of the information recalled have not found any statistically significant differences except that Zinn found that low grade four readers produced significantly more information in the text external category.

Chapter III

THE EXPERIMENTAL DESIGN

This chapter will describe the selection of the sample, the nature of the testing instruments, the pilot study, and the categorization, inter-rater reliability and analysis of the data.

The Selection of the Sample

The test sample was drawn from the grade six student population of 11 elementary schools in the Edmonton Public School District. These schools serve predominantly upper-middle class, English-speaking neighbourhoods.

Using the records of the Edmonton Public School District, an initial test population of 42 students was chosen from the 11 schools. These students were chosen on the basis of their performance on intelligence and reading achievement tests. Intelligence was measured by the verbal battery on the Canadian Cognitive Abilities Test. Reading achievement was measured by the comprehension section of the Edmonton Public Schools Elementary Reading Test given in June of the previous school year, when all the students were in grade five.

The sample was dichotomized into able and less able readers and, in order to ensure that there would be a difference between these two groups, cut-off points were chosen on the reading

comprehension scores. Since the scores were given in percentiles, the 25th and 85th percentiles were chosen as approximate guidelines for selecting the initial test sample. That is, the less able readers were those students whose comprehension percentile was below or slightly above the 25th percentile and the able readers were those students whose comprehension percentile was above or slightly below the 85th percentile. In the final sample, the reading comprehension percentile scores of the able and less able readers ranged from 86 to 99 and 8 to 27 respectively. The means of the respective groups were 92.38 and 18.38 which differed significantly at the .001 level.

An attempt was made to choose a sample of students who were of similar intellectual ability so that differences between able and less able readers would not be attributable to differences in intelligence. Thus, all sample students had verbal intelligence scores between 97 and 124. The means for the able and less able were 114.44 and 106.19 respectively which were significantly different ($p < .001$).

The fact that the able and less able reader groups varied significantly on verbal IQ, in spite of attempts to control this variable, might indicate a realistic classroom situation. It is not always possible to find a number of grade six students who are less able readers but whose IQ is comparable to that of the able readers in the same classroom. It might indicate, too, that reading comprehension difficulties tend to lower IQ scores on group intelligence tests.

Although the sex of the sample population was not considered

to be a key factor, the investigator thought it would be best to control the sex variable as much as possible. Therefore, the final sample consisted of eight males and eight females in the group of able readers and nine males and seven females in the less able group. Data for the sample are summarized in Table 3.1

All of the sample students were receiving "regular" classroom instruction with no remedial or "special class" instruction. The able readers were considered, by their teachers, to be conscientious, hard-working students but not exceptional nor attending "gifted programs."

Testing Instruments

The results from two tests were used in this study: The Edmonton Public Schools Elementary Reading Test and the Canadian Cognitive Abilities Test.

In order to obtain a measure of each student's reading comprehension, The Edmonton Public Schools Elementary Reading Test was used. This test was constructed from materials available from the Edmonton Public School District and the Houghton-Mifflin publishing company. The comprehension section contains 90 questions designed to assess vocabulary and literal, inferential and critical comprehension. It was administered to all grade five students and final norms were developed in June, 1979. The results were tested for reliability using the KR20 formula. The reliability of the total test was found to be 0.949. Content validity was obtained by having groups of teachers analyse the test items.

Table 3.1

Background Information on Sample

	Subject	Sex	Comprehension Percentile Score (EPS Elementary Reading Test)	Verbal IQ Score (Canadian Cognitive Abilities Test)
	01	F	99	119
	02	F	91	122
	03	F	94	124
	04	F	94	110
	05	F	91	116
	06	F	91	113
	07	F	86	111
Able	08	F	94	116
Readers	09	M	86	108
	10	M	99	112
	11	M	96	124
	12	M	94	105
	13	M	89	114
	14	M	91	108
	15	M	94	112
	16	M	89	117
	17	F	10	108
	18	F	20	106
	19	F	11	99
	20	F	08	97
	21	F	24	115
Less	22	F	24	115
Able	23	F	15	104
Readers	24	M	15	100
	25	M	26	99
	26	M	18	108
	27	M	14	101
	28	M	19	97
	29	M	18	111
	30	M	26	124
	31	M	19	105
	32	M	27	110

It was assumed, for purposes of this study, that students who were administered the test in the spring of 1979, when they were in grade five, would maintain their able or less able status in the spring of 1980, when they were in grade six. Two students were eliminated from the less able group of the initial sample because, in their teacher's judgement, they had made substantial gains during their grade six year.

In order to obtain a measure of each student's intelligence, the scores of the Canadian Cognitive Abilities Test were used. The Canadian Cognitive Abilities Test for grades 3-9 was normed in 1973 using a stratified random sample of 139 schools from across Canada in which English was the language of instruction. The verbal battery of the test consists of items in each of the following areas: vocabulary, sentence completion, verbal classification and verbal analogies. The administration manual does not give information on the reliability and validity of this test.

Both tests were administered by the classroom teachers in group situations, according to the instructions for administration in the test manuals.

The Reading Selection

Students in this study were required to read a passage of discourse silently and to give an oral recall of the passage. The passage was chosen based on a number of criteria. First, the passage should be of a type that was familiar to grade six students so that they would be able to make use of text structure in order to assist

comprehension. For this reason, the investigator decided that a narrative selection would be most appropriate since most students would have had experience with narrative selections from an early age. Second, the selection should be one which, potentially, would generate substantial unaided oral recall. It should be interesting to read and of enough interest that students would feel it worth retelling. The details and plot of the story should be such that it would be possible for students to give a unified, clear retelling. Thirdly, the story should be one which did not present decoding problems for any readers, thus providing a possible obstacle to comprehension.

Three stories which met these criteria were tested in a pilot study. One had been used in a previous study (Cronin, 1980). One was an Indian legend similar in structure to Cronin's passage and the other passage, about a boy who learns that his father has recently become unemployed, was taken from a published reading series.

Categories for Protocol Analysis

The categories used for protocol analysis were Fagan's (in press) revision of Drum and Lantaff's (1977a) categories. The main categories and their descriptions are listed below.

Category A. Text Exact

This category includes information from the text in its exact form or with minimal variations. It is assumed that this information was stored in rote fashion or is automatically constrained by other information and is 'reproduced' in a similar state.

Category B. Text Specific

In this category is placed information recalled that has specific references in the text. The reader may have

'transformed' some of this information by reordering or substituting lexical items.

Category C. Text Entailed

The information retrived is (a) a paraphrase of or synonymous with the information input, but the unit of recall includes information from more than one unit of input, or (b) a superordinate statement subsuming information from more than one text unit. It may be assumed that at the time of comprehending the reader 'constructed' information and may still 'transform' it at the point of recall.

Category D. Text Experiential

This information is added by the reader to fill in gaps in the text data. The reader is 'reconstructing' information based on prior knowledge which may be of world events such as rodeo, or from having read or listened to other texts.

Category E. Text Erroneous

The protocol units involve the use of text information which the reader has processed incorrectly either at the time of comprehending or at production of the recall.
(Fagan, in press)

These main categories are summarized in Table 3.2 which includes the sub-categories for each. Appendix B contains a complete description of how clausal units were assigned to each of the main categories. Appendix C contains a protocol of a student's unaided recall that has been analysed into clausal units and each unit labelled with the category to which it was assigned.

The Pilot Study

A pilot study was conducted in the spring of 1980. The purposes included the following: choosing a suitable passage to be read by the students, devising the directions to be given to the students, and choosing the unit of analysis for the oral recall protocols.

Table 3.2

Category System for Scoring Recall Protocols

A. Text Exact Information

- A1 Verbatim Recall
- A2 Partial Recall

B. Text Specific Information

- B1 Substitution of Pronouns
- B2 Synonymy of Elements

C. Text Entailed Information

- C1 Synthesis
- C2 Summary

D. Text Experiential Information

- D1 Inference
- D2 Case Related Information
- D3 Experiential Intrusions
- D4 Storyline Additions

E. Text Erroneous Information

- E1 Errors in Dates and Proper Names
- E2 Erroneous Expansions/Additions
- E3 Inaccurate/Incorrect Synthesis
- E4 Inaccurate/Incorrect Summary
- E5 Faulty Inference

The pilot study was conducted with six (three able readers and three less able readers) grade six students from an elementary school in the Edmonton Public School District who were similar, in IQ and comprehension, to the sample students. Each student was asked to read silently the three passages mentioned above and to tell the story back to the investigator. After analysing and comparing the oral recalls for the six students on the three passages, and after discussing the passages with the students, it was decided that the passage used by Cronin, The Stranger and the Man Who Had No Luck (see Appendix A), would be most suitable. This passage generated suitable oral retellings and the pilot students chose it as the most interesting story. The pilot students reported no difficulties with word identification or the concepts contained in the story.

The directions read to the students were those used by Furniss (1978). These directions, with minor changes to make them more specific, were judged to be suitable and understandable to the students. A short practice paragraph was inserted in order that the students would feel more at ease with the recall task, since the task of orally retelling a story was unfamiliar to them. The directions read to each student are given below.

Directions

I am going to ask you to read a passage. You can read it at your own rate but make sure you understand it well. Tell me when you have finished reading. When you have finished reading you will be asked to tell the story back.

Here is a short, practice paragraph. When you have finished reading, I will ask you to tell the story back. I will use a tape recorder so that you don't have to speak slowly or repeat.

Please read this paragraph—

(The student reads a short paragraph.)

Now, can you tell me the story back?

(The student tells the story back and it is recorded on tape.)

Good. Do you understand what you are to do? Are there any questions?

Please read this passage and tell it back to me when you are finished.

(Student reads the story, see Appendix A.)

Now can you tell me the story back?

(The student tells the story back and it is recorded on tape.)

The investigator used the transcribed, oral recall of the pilot students to make final decisions about the unit of analysis. After analysing the protocols using syntactic propositions, basic and alternate t-units, and clauses, it was decided that clauses would be the most appropriate unit of analysis. The proposition is usually a smaller language structure than the t-unit and clause and therefore students who were apparently summarizing information were not having many propositions assigned to that category. On the other hand, the t-unit is a longer structure, giving the students an opportunity to include a lot of information and the investigator found it difficult to assign t-units to the text exact and text specific categories even though a portion of the information in these t-units was an exact match with a portion of information in the text. Also, the t-unit length led too easily to assigning a disproportionate number of units to the text entailed category.

The clause, being of intermediate length, did not completely solve these problems but was determined to be a suitable compromise. It was decided, however, that some clausal units should be assigned to two different categories in order to appropriately reflect the relationship of the recall information to text information.

Procedure for Gathering the Data

The investigator administered the reading passage to each sample student and gathered all the data. The investigator met with each student in a conference room in each school, which was without distractions. After a period of informal conversation, each student was given an explanation for why he was doing this reading task. The students were also told that this was not a test and that it would not affect their school marks but that it was important that they do their best.

The directions were read to each student and, after practising on the sample paragraph, each student was required to tell the story back immediately following the silent reading. The oral recall of each student was tape recorded.

Coding the Protocols

The tape recorded protocols were transcribed; each transcription was analysed into clausal units and each clausal unit was then assigned to one of the five comprehension categories. This was accomplished following the procedures described by Fagan (in press) (see Appendix B). Some clausal units were assigned to two different

categories in order to reflect the relationship of the recall information to the text information adequately.

In order to ensure the reliability of the coding by the investigator, his advisor also analysed the protocols of eight students. Inter-rater reliability was calculated using the Arrington Formula as explained in Feifel and Lorge (1950), i.e.,

$$\frac{2 \times \text{agreements}}{(2 \times \text{agreements}) + \text{disagreements}}$$

This formula gave a reliability score of 0.96 for clausal units and 0.93 for the recall categories, both of which are considered appropriate rates of agreement.

Statistical Analysis of the Data

The statistical analysis of the data was performed by using two way analysis of variance with repeated measures on the recall categories (ANOV 23). A t-test was used to test the significant difference between the number of recall units identified by able and less able readers.

Since the protocols contained different numbers of clauses, the number of categories assigned could be a function of the amount of information recalled. Consequently, percentages were used when comparing the number of clauses in the recall categories. These percentages represent the percentage of the total number of category designations assigned which fall into each category.

Summary

A sample of 32 grade six readers was selected from 11 elementary schools in the Edmonton Public School District. The result of the Edmonton Public Schools Elementary Reading Test was used to group the sample readers into two groups, able and less able readers. The students (IQ range 97-124) were grouped according to their achievement in reading comprehension (at or below the 27th percentile and at or above the 86th percentile).

Each student was asked to read a narrative selection and asked to tell the story back. The unaided, oral recalls were tape recorded and transcribed. Each transcription was analysed into clauses and each clause was assigned to a recall category depending upon its relationship to the text. Statistical treatment of the data was done by a two way analysis of variance with repeated measures on the recall categories and a t-test for significant differences in the quantity of recall.

Chapter IV

FINDINGS AND DISCUSSION

This chapter reports the findings of the study. Each hypothesis is restated from Chapter I and a statement of rejection or non-rejection is given. This is followed by a table giving the basis upon which the hypothesis was or was not rejected. In reporting the results of the statistical analysis, the .05 level of significance was accepted (Ferguson, 1976, p. 162). Next is a discussion of the findings. The chapter concludes with a summary of the findings.

Hypothesis 1

> There will be no significant main effects or interaction for reading achievement groups or recall categories (text exact, text specific, text entailed, text experiential, text erroneous) on the percentage of recall units.

Findings

The two way analysis of variance with repeated measures on the recall categories revealed the following findings:

1. There were no significant differences between achievement groups in the percentage of recall units falling into the recall categories as a group (Table 4.1). In this respect, Hypothesis 1 was not rejected. It appears from these results that able and less able readers do not differ significantly in their ability to select,

Table 4.1

Summary of Two Way Analysis of Variance with Repeated Measures for Reading Achievement Groups on Recall Categories

Source of Variation	SS	DF	MS	F	p
Between Subjects	4.934	31			
'A' Main Effects	0.172**	1	0.172	1.082	0.30657
Subjects within Groups	4.766	30	0.159		
Within Subjects	44895.301	128			
'B' Main Effects	34860.609	4	8715.152	107.180	0.0*
'A x B' Interaction	227.141	4	69.285	0.852	0.4950129
'B' x Subjects within Groups	9757.547	120	81.313		

* Significant at .01 level ($p \leq .01$)
** Not equal to zero due to "rounding-off"

Factor A = Reading achievement levels
Factor B = Recall categories

remember and recall information which fits into each recall category.

2. There was no significant interaction between reading achievement groups and the percentage of recall units falling into each of the recall categories. In this respect, also, Hypothesis 1 was not rejected (Table 4.1). These results indicate that the proportion of recall units in each category was independent from achievement level. Both able and less able readers performed similarly in the proportion of recall units in each category. Figure 4.1 illustrates the mean percentage score for each group in graphic form.

3. There were significant differences ($p \leq .05$) between categories for the total group. In this respect, Hypothesis 1 was rejected (Table 4.1). These results indicate that there were significant differences between the percentage of recall units falling into the recall categories. A Newman-Keuls post hoc comparison was performed on the recall category means (Winer, 1971) to ascertain which pairs of recall categories were significantly different in the percentage of units assigned to them (Table 4.2). This procedure indicates that able and less able readers in this study recall significantly more information in the text specific category than in any other category. They recall significantly more text entailed information than text experiential, text erroneous or text exact. Also, the readers recalled significantly more information in the text experiential category than in the text erroneous or text exact category. There was no significant difference between the percentage of recall units in the text erroneous and text exact categories.

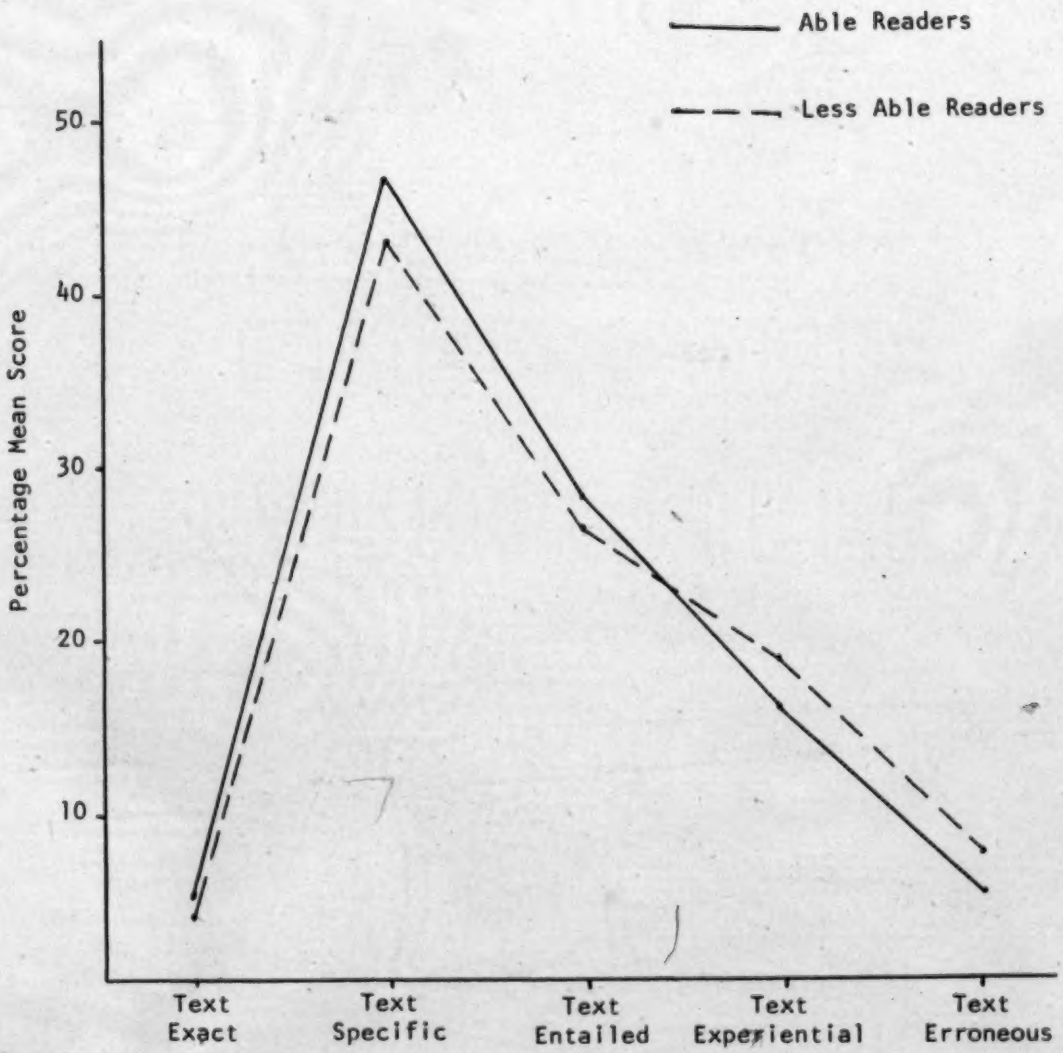

Figure 4.1

Mean Percentage of Recall Units in Each Recall Category
for Able and Less Able Readers

Table 4.2

Tests on Recall Category Means Using Newman-Keuls Procedure

		Text Exact	Text Erroneous	Text Experiential	Text Entailed	Text Specific
Ordered Means		4.281	6.797	17.48	26.76	44.815
		Exact	Erroneous	Experiential	Entailed	Specific
Differences between Pairs	Exact		2.516	13.199	22.479	40.534
	Erroneous			10.683	19.963	38.018
	Experiential				9.28	22.335
	Entailed					18.055
$S_{\bar{B}} = 1.594$			r = 2	3	4	5
$q_{.95}(r,120)$			2.80	3.36	3.69	3.92
critical value $S_{\bar{B}}\, q_{.95}(r,120)$			4.463	5.356	5.882	6.248
		Text Exact	Text Erroneous	Text Experiential	Text Entailed	Text Specific
Text Exact			--	*	*	*
Text Erroneous				*	*	*
Text Experiential					*	*
Text Entailed						*

*Significant at .05 level.

Since no significant differences were found between able and less able readers in the percentage of recall units in the recall categories and there was no significant interaction between reading achievement group and the percentage of units in the categories, these two findings are combined for the purposes of the following discussion.

Discussion 1

These findings are consistent with those of Brake (1981) who also found that there were no significant differences between low and high achieving grade two students in the proportion of recall units falling in each of the recall categories. The findings are also consistent with those of Berger and Perfetti (1977) who found that skilled and unskilled readers recall the same type of information.

The results are not consistent with Zinn's (1979) study. She found that high and low achieving grade four readers differed significantly in the proportion of recall units falling into the text external category. However, it is difficult to make comparisons with Zinn's findings since the categories used in her study (Furniss, 1978) were not exactly the same as those used in the present study (Fagan, in press). Also, Zinn used t-units and alternate t-units as the unit of analysis for the text and the recall protocols.

The findings of this study are also not totally consistent with the findings of Drum and Lantaff (1977b) who found differences in the type of information recalled by able and below average readers. The present study indicates that able and less able readers were processing information in a similar manner. Comparisons

between this study and that of Drum and Lantaff are also difficult because the latter study used the proposition as the unit of analysis, the categories were differently defined and the number of words per category became the score for analysis.

There are also sample and procedural differences between this study and that of Drum and Lantaff. While this study used grade six readers, Drum and Lantaff used grade eight readers. As a reader becomes more mature, background knowledge continues to be an important factor in comprehension but the reader becomes more proficient at differentiating between information that is found in the text and information possessed by the reader which is independent of the text. Maybe high achievers at the grade eight level can differentiate between these two types of information better than below average achievers. Thus they are able to produce more text specific and entailed information and less text elicited and evoked information. On the other hand, grade six able readers might not have learned to differentiate between text information and prior information possessed by the reader to a sufficient degree to differ from less able readers (Spiro, 1977).

Furthermore, the readers in the Drum and Lantaff study read a descriptive informational passage while the grade six readers in this study read a narrative passage. Perhaps the less able readers in this study were quite familiar with narrative passages that have a folk tale structure and therefore were able to use their knowledge of story structures to select, remember and retrieve information in a similar fashion to able readers. In other words, able and less able

readers might read and recall narrative passages in a similar fashion and differences between the groups become pronounced only when reading descriptive informational passages whose structure might be relatively unfamiliar to less able readers and where prior knowledge is insufficient to aid comprehension.

While Furniss (1978) found that type of passage did not affect the number of recall units in the recall categories for proficient readers, the same might not hold true for less proficient readers. Descriptive-informational passages might require reading strategies that less proficient readers have not fully developed. The vocabulary, syntax, concept load, organizational structure and prior knowledge of the reader might all be factors contributing to making this type of passage difficult for less proficient readers. It might be that significant differences in the proportion of recall units in the recall categories might be found between able and less able readers on descriptive-informational passages whereas they were not found on the narrative passage used in this study.

Another reason for the discrepancy between the results of the present and previous studies might be the readability of the passages used in each study. In the Drum and Lantaff experiment, they report Fry readability scores for their passages ranging from 7.4 to 8.0; thus the able readers might have been reading at instructional level and the below average readers might have been experiencing frustration. None of the sample students in this study indicated any difficulty with word identification or with understanding the concepts presented. The Fry readability formula rates

this passage as being at the mid grade three level. Thus, perhaps all the readers in this study were reading at independent or instructional level and were able to perform similarily on the recall task.

Drum and Lantaff (1977b) question whether their findings would have been similar if the able readers read more difficult material and the less able easier material (p. 8). Drum and Lantaff's results might reflect differences between high reading achievers reading at independent level and low reading achievers reading at frustration level. If this is so, the results could be a function of the readability level of the passage more than of processing differences between high and low reading achievers.

There is a small measure of consistency between the findings of this study and Drum and Lantaff's. The means recorded in Table 4.3 indicate that able readers recalled more units in the text exact, text specific and text entailed categories and less units in the text experiential and text erroneous categories than did the less able readers. The differences in the means for each group are small and not statistically significant. These differences might become more pronounced if the readability of the passage were increased and the less able readers were less able to cope with the text.

In addition to readability of passages, the criteria for able and less able readers may be discrepant across studies. The readers in this study were assigned to the able or less able group on the basis of their scores on the Edmonton Public School Board Reading Survey. The cut-off points for assigning to groups (see

Table 4.3

Summary of Means and Standard Deviations for Reading Achievement Groups in Each Recall Category

Recall Category	Means		Standard Deviations	
	Able	Less Able	Able	Less Able
Text Exact	5.025	3.537	4.297	4.209
Text Specific	46.562	43.075	5.980	13.156
Text Entailed	27.400	26.119	7.530	8.767
Text Experiential	16.362	18.600	8.888	10.294
Text Erroneous	4.950	8.644	3.593	8.624

Chapter III) might not have been different enough or this test might not discriminate sufficiently amongst readers on the basis of reading achievement to the same degree as do the standardized tests used in other studies. Therefore, both the able and less able groups might have been drawn from the same hypothetical population. One piece of evidence, however, seems to contradict this. Table 4.3 indicates the standard deviations for the two groups in each recall category. It would appear that the standard deviations for the less able group are larger in four of the five categories and much larger in the text specific and text erroneous recall categories. This might suggest that the less able group is drawn from a different population than the able group but given text at an appropriate level can recall information in a manner which is consistent with that of able readers.

The standard deviations also indicate that there is more variance in the less able group than in the able group. On this task, the able group performed quite similarly but the low readers varied in their approach to the recall task indicating that this group cannot be thought of as homogeneous in the manner in which it processes print for future recall. Perhaps a subgroup of this less able group which would differ significantly from the able readers in the percentage of units falling into the recall categories could possibly be identified. The suggestion that the less able group is not homogeneous is supported by Malicky and Beebe (in press) who found differences in the recall categories for low gain and high gain remedial readers.

The administration of the recall task might have had some

effect upon the results. The directions given were clear to the readers but they might have led to a straight recall task with a minimal amount of in-depth processing. For example, the investigator noticed that none of the students expressed interest in or commented on the question of who or what the main character was in the story (see Appendix A). This appears to indicate that the students viewed the task as merely a recall of the literal meaning and as a story to be read, held in memory only for the time it took to retell it and then to be forgotten (Spiro, 1975, p. 11). Perhaps in order to point out significant differences between the recalls of able and less able readers, a different purpose for the reading is required in order to involve higher order processing. Other researchers (Kintsch, 1978; Mandler and Johnson, 1977) have observed that comprehension and recall are a function of the context in which the reading takes place. A particular purpose might be needed in the directions in order to delineate any differences there might be in the recalls of these two groups of readers. Without a context in which to place the passage to be read or any perceived use for the information, unaided recall might not be a clear enough reflection of the comprehension process that classroom teachers expect students to demonstrate.

Some studies (Kintsch, 1978) have used a distracting task between the time the subject reads the passage and gives the unaided recall. Other studies (Drum and Lantaff, 1977b) have used delayed recall. These techniques might result in changing the recall task sufficiently to delineate differences between able and less able readers since a delay would allow for more in-depth processing.

Since Brake (1981) found that mode of reading (oral versus silent) affected the proportion of units in the recall categories, it might be that these categories are best used to delineate differences between modes of reading rather than merely between high and low reading achievers.

In summary, recall differences as indicated by the comprehension categories in this study might not be a generalized finding between able and less able readers. In order to detect differences, a number of experimental factors might need to be considered such as the discrepancy between able and less able readers, the readability of the passages in relation to the readers, the nature of the passage (descriptive vs narrative), the mode of reading, the directions, the time of recall, and the manner in which the protocols are divided for assignment to categories.

Discussion 2

Significant differences were found in the percentages of recall units in each recall category over the total sample (Table 4.2). Both able and less able readers recalled significantly more information in the text specific category than in any other category. The text specific category includes information that has a specific reference in the text but has been transformed by a reordering of information or substitution of lexical items. Thus, it appears from these results that, after reading a passage at an appropriate level, able and less able readers do not reproduce text through verbatim recall but rather retrieve text information by transforming information which has a specific reference in the text.

Each sub-group recalled significantly more text entailed information than text experiential, text erroneous or text exact. Both able and less able readers in this study were able to summarize and synthesize information from more than one text unit. The text entailed category is one step further removed from verbatim recall than text specific (Figure 4.2). Significantly more units in the text experiential category were recalled than in the text erroneous or text exact categories. The text experiential category is another step removed from verbatim recall. Thus, it appears from the results of this study that able and less able readers do not attempt verbatim recall of text as much as they attempt to reconstruct text information by reordering, substituting lexical items, summarizing, synthesizing and adding information based upon prior knowledge. These findings support the view of Tierney, Bridge and Cera (1979), who state that recall is both an abstractive and constructive process. Information in the text specific category is more abstractive on the continuum of categories and text experiential is more constructive. Figure 4.2 highlights the relationship of the text categories to the amount of text involved.

It appears, too, from the findings of this study that both able and less able readers recall text specific information to the greatest degree. Perhaps text specific information forms the basis for the recall of text entailed and text experiential information. If this is so, this finding is in agreement with the findings of Beebe, Fagan and Malicky (in press) who state that the importance of verbatim information is what the reader does with it such as using it to synthesize or elaborate text.

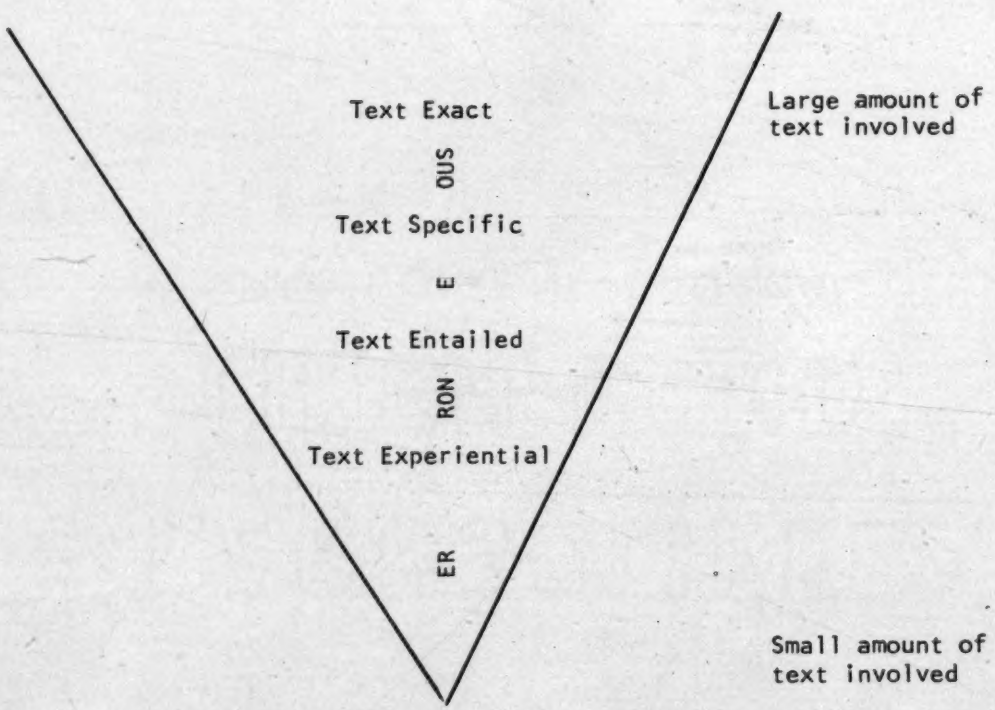

Figure 4.2

Continuum of Text Dependency for Each Recall Category
(Fagan, in press)

Hypothesis 2

There will be no significant differences between able and less able readers in the number of recall units identified.

Findings

There was no significant difference between able and less able readers in the number of recall units identified. Hypothesis 2 was not rejected (Table 4.4).

Discussion

The results indicate that in this study grade six able and less able readers did not differ significantly in the amount of information they recalled following the reading of a narrative passage. Both achievement groups were able to select, remember and retrieve a similar amount of information for recall.

Much of the discussion which applies to this result has been previously presented. Some studies (Berger and Perfetti, 1977) have found that low and high reading achievers recall similar types of information but that high reading achievers recall more. This was not the finding of the present study. Various reasons might account for this. The passage used was of a type (Indian folk tale) quite familiar to elementary school students and therefore all readers, irrespective of reading ability, might possess sufficient background knowledge to comprehend this story. The fact that it was a narrative selection and not a descriptive-informational passage might also have contributed to similar amounts of recall since all readers have been exposed to stories from an early age and have developed a sense of

Table 4.4

Results of t-Test for Independent Means Comparing Able and Less Able Readers on the Number of Clausal Units Recalled

Means		Standard Deviation				Probability
Able	Less Able	Able	Less Able	DF	t	(2-tailed)
42.000	31.750	18.794	12.710	30	1.81	0.081

story schema and sufficient background knowledge.

Since the story did not give the readers difficulty in word identification or concept load, all readers might have been reading at instructional or independent reading level. Perhaps able and less able readers are able to select, remember and recall similar quantities of information if they are all reading at either of these levels. The findings of other studies that indicate significant differences between achievement groups in the quantity of recall might have had the low achievers reading at frustration level which prevented them from recalling as much information as high achievers.

Table 4.4 indicates that the able readers had a larger standard deviation in the number of clausal units recalled than did the less able group. When this is compared to the standard deviations in each recall category (Table 4.3), it can be noted that while the less able group was more homogeneous than the able group in amount recalled, they were less homogeneous in the type of information recalled. The main source of variation within the less able group appears to be in the type of information recalled.

The fact that the able and less able readers did not differ significantly in the amount recalled possibly provides more evidence that the achievement groups in this study were not sufficiently different in achievement in reading comprehension. The testing instrument used to dichotomize the sample into achievement groups might not have been able to discriminate amongst readers to a sufficient degree or the cut-off points (see Chapter III) might not have been far enough apart. However, the standard deviations for the

two groups (see Table 4.4) do seem to indicate two different and separate groups were involved in the study.

Summary

Subjects were presented with a narrative passage which they were asked to read silently. Unaided recalls were compared for able and less able readers.

The findings revealed that there were no significant differences for able and less able readers in the percentage of recall units falling into each category. There was no significant interaction between achievement groups and the percentage of recall units in the categories. There were significant differences between the percentage of units recalled in each recall category. Further analysis of the data revealed that the total group of subjects recalled significantly more information in the text specific category than in any other category; they recalled significantly more information in the text entailed category than in the text experiential, erroneous or exact categories; they recalled significantly more information in the text experiential category than in either the text erroneous or text exact category. No significant differences were found between the amount of information recalled in the text exact and text erroneous categories.

The findings also revealed that able and less able readers did not differ significantly on the number of clausal units in their recall protocols.

Chapter V

SUMMARY, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This chapter will present a summary of the study, major findings and conclusions, implications for classroom instruction and suggestions for future research.

Summary of the Study

The main purpose of this study was to investigate the nature of silent reading comprehension of able and less able readers. In order to accomplish this purpose, unaided, oral recall protocols were analysed and compared to the original text to determine whether able and less able readers differ in the quantity and quality of what they recall.

From the grade six populations of 11 elementary schools in the Edmonton Public School District, 32 subjects were chosen as the sample for the study. These students were chosen on the basis of their performance on the Canadian Cognitive Abilities Test and the comprehension subtest of the Edmonton Public Schools Elementary Reading Test. On the basis of the results of these tests, an equal number of students were assigned to two groups, able readers and less able readers.

A narrative reading selection was administered, individually, by the investigator to the 32 students. Each student read the paragraph

silently and told the story back to the investigator immediately following the reading. The unaided recall of each student was recorded on tape and transcribed. The original text and each recall protocol were analysed into clauses. The recall clauses were subsequently categorized into five recall categories based upon their relationship to the original text.

The statistical treatment of the data included a two way analysis of variance with repeated measures on the recall categories and a t-test to determine whether the amount of information recalled by the two groups differed significantly.

Major Findings and Conclusions

Able and less able readers were compared to determine whether there were significant differences between the two groups in the quantity and quality of their unaided, oral recall after reading a narrative passage. Analysis revealed no significant differences between able and less able readers in the quality of the information they recalled as measured by the relationship of the recall units to the text. Able and less able readers did not differ significantly in the percentage of recall units falling into each of the five recall categories. Based on this analysis, it can be concluded that able and less able students recall similar types of information after reading a narrative selection at an appropriate reading level. Both achievement groups are similar in their ability to select, remember and recall information. It can be inferred from this that the recall processes used by able and less able readers in this study are very

similar.

There was no significant interaction between reading achievement groups and the percentage of information in each recall category. The mean percentages for able and less able readers in each category show a very similar profile when illustrated in graphic form (Figure 4.1).

Significant differences were found, however, between the percentage of recall units in the recall categories. The subjects' protocols contained a higher percentage of recall units in the text specific category than in any other category. They had a significantly higher percentage of recall units in the text entailed category than in the text experiential, text exact or text erroneous category. They also had a significantly higher percentage of recall units in the text experiential category than in either the text exact or text erroneous category. Thus, it can be concluded that the able and less able readers in this study recall similar types of information from text and that both groups tend to transform and reconstruct text rather than reproduce it verbatim. All three categories which contained the highest percentage of recall units represent at least some departure from verbatim recall. Text specific information is the most abstractive of the three categories, allowing for transformations by reordering or substitution of lexical items. Text experiential is the most constructive, allowing the reader to relate prior knowledge to input information. Text entailed is between the other two categories on the abstractive-constructive continuum. This category contains recall information which is a summary or synthesis of more

than one text unit. Therefore, given a narrative passage at a reading level where difficulties are not encountered with word identification and concept load, both able and less able readers are able to process information by transforming, summarizing, synthesizing and relating text information to prior knowledge.

There was no significant difference between able and less able readers in the number of recall units identified in the recall protocols. In this study the able and less able readers did not differ significantly with respect to the quantity of information recalled.

In summary, the able and less able readers in this study recalled similar amounts of information from their reading and similar types of information. It can be inferred that, given reading material at an instructional or independent reading level, able and less able readers use similar processes when they recall what they have read. If recall is a reflection of what happens in reading comprehension then it can be inferred that able and less able readers use similar processes when comprehending print.

Implications of the Study for the Classroom

The finding that able and less able readers do not differ significantly in the type of information in the recall categories indicates that both achievement groups use similar processes to recall what they read. The finding further indicates that less able readers do bring information to the page and are not trying to be too literal in their recall. Instruction in classrooms might be encouraging all

children to interact with print on the basis of what they know already. If this is the case, then teachers and students should be encouraged to continue this practice. Another implication of this finding is that it is important to present less able readers with reading material at an independent or instructional level so that they have an opportunity to use the same processes as able readers when recalling what they read.

The finding that the subjects in this study had significantly more recall units in the text specific category indicates that all readers consider this type of information important for oral recall. Perhaps this type of information is used as a basis for summarizing, synthesizing and applying prior knowledge (Beebe, Fagan and Malicky, 1981). The implication for classroom teachers is to aid students in understanding and recalling text specific information and to use it as a basis for higher level processing.

Test results and teacher opinion agreed that the subjects in this study formed two groups, able and less able readers. However, the unaided recalls of the subjects in these two groups were not significantly different in either quality or quantity of information. Thus this task did not discriminate between able and less able readers. One possible implication is that unaided, oral recall might be a reflection of something different than what classroom teachers call comprehension or what is measured by a particular test. Another possible implication is that "regular" classrooms might not have many really low readers since they are enrolled in "special" classes by the time they have reached grade six. If this is the case, then "regular"

classroom teachers do not need to differentiate instruction to the extent that low achievers as a group receive a separate remedial program.

Suggestions for Further Research

The Reading Selection

1. This study found no significant differences between able and less able readers in the quantity and quality of information in their unaided, oral recalls. This result was obtained using a reading selection which was written in a style of language similar to that of oral story telling. It was a narrative passage, written at a mid grade three level and thus relatively easy reading for all subjects. Further research is needed to determine whether adjusting the reading level of the passage would give different or similar results. Perhaps an increase in the reading level would result in differences in the number of recall units in the five categories for different achievement groups. Further research needs to be conducted to investigate differences in unaided recalls of able and less able readers at independent, instructional and frustration reading levels.

2. The reading selection in this study was written in narrative style. Further research should investigate whether significant differences in the recall categories between able and less able readers might be found on descriptive-informational passages. This research might indicate whether or not able readers are as equally able to deal with this type of selection as with narration. Perhaps less able readers have more difficulty with descriptive-informational passages than do able readers. Able readers might be flexible enough in their

reading strategies to cope with many different types of reading selections whereas less able readers are not.

The Unaided Recall Task

1. Subjects in this study were asked to tell back the story they had read. The analysis of this recall task did not result in significant differences between able and less able readers in spite of the fact that tests and teacher judgements identified two distinct groups. Also, the researcher noticed that the subjects did not comment on such things as who the main character in the selection was. These facts indicate that the subjects might have viewed the task as one in which they had to remember information only long enough to retell it and then they could forget it. Thus higher level processing of the input was not required. It might be this higher level processing which differentiates between able and less able readers. Further research should attempt to design recall tasks which require higher level processing in order to see whether differences between able and less able readers' recalls remain non-significant.

2. Research which gives the subjects a reason or purpose for the reading beyond simple retelling would be useful. Providing a reading purpose might result in higher level processing. Perhaps able and less able readers differ in their recalls depending on the purpose for reading. Perhaps, too, able readers are flexible enough to deal with many purposes whereas less able readers are not and differences might result in the recall categories. Some studies (Furniss, 1978) have used delayed recall in an attempt to avoid

simple retelling. Others (Spiro, 1977) have given the subjects different reasons for being asked to read. Any one of these approaches would be useful in further research to see whether or not there are significant differences between able and less able readers in the recall of what they have read.

Identification of the Sample

1. Future researchers using recall categories should take care when choosing the sample subjects. It would be useful if studies which compared high and low achievement groups ensured that there was a clear distinction between these groups. Perhaps multiple measures of achievement could be used or at least a standardized test which has been shown to discriminate well between achievement groups.

2. This study and that of Beebe and Malicky (in press) indicate that less able readers are not a homogeneous group. Perhaps care needs to be taken when choosing a less able group so that the amount of variance in the number of units in the recall categories could be decreased. If the low group were defined more homogeneously, the experimental results might be different. Some less able readers might differ significantly from able readers in the quantity and quality of information recalled whereas they might not when combined with other less able readers.

This study used two groups of readers, able and less able, and thus the variance in the sample was high. Samples which have less variance do not need as much difference in the category means to be statistically significant. Further research should include a group of average readers. This would result in less variance within

the sample and would lead to having a sample which more closely represents the students in a normal classroom.

3. Able readers seemed to vary more than less able readers in the amount of recall produced. Less able readers varied more than able readers in the percentage of recall units in some of the categories. It would be useful to investigate some of these individuals to study the nature of the recall in more detail. For example, do able readers with shorter recalls tend to summarize and synthesize more than able readers with long recalls? Or, does a less able reader with a large percentage of units in the text experiential category tend to have a higher percentage of units in the text erroneous category than does a less able reader with few units in the text experiential category?

4. Grade six students were used in this study. Other studies might be replicated at this grade level but also investigate the nature of unaided recall for other grade levels.

Analysis of the Data

1. This study analysed the text and the recall protocols into clauses and assigned each clausal unit in the protocols to a recall category (Fagan, in press). Other studies have used propositions, t-units and alternate t-units as the unit of analysis and have used other category systems. Because of the lack of consistency in the studies, comparisons are difficult to make. There is a need, in further research, to be more consistent in the categories and the unit of analysis used.

Design of the Study

1. The researcher noted that the length of the recall protocol varied within the groups although differences between groups were not statistically significant. This study did not treat students who produced a large amount of recall differently than those who produced a little amount. However, these students probably are different. Further research should take these differences into account. Perhaps each subject could be given a passage to read and recall. Then each student could be classified as a high, average or low producer of recall information. Thus the sample would consist of a high reading achievement group made up of high, average and low recall producers and a similar low achievement group. Then it would be possible to discover the percentage of recall units in each category for high comprehenders with high oral recall, etc.

2. If this type of standardization of length of recall were implemented, then raw scores instead of proportions could be used to quantify the data in each category. This would avoid the problem that percentages and proportions are not completely appropriate for analysis of variance procedures since they are not free to vary. It would also avoid the possibility of scoring a protocol with only one clause and another protocol with ten clauses as both having 100% of the recall units in a specific category and thus treating the recalls as though they were the same.

Concluding Statement

According to some theorists, comprehension is a reconstruction of meaning accomplished by the interaction of the reader's background knowledge with information cues he has processed from print. Some readers appear to be more proficient than others at comprehending what they read. Since comprehension is a covert process, it must be studied by examining its product. Unaided, oral recall has been used in this study, and others, as a product of comprehension. By analysing how the unaided, oral recalls of able and less able readers differ in quantity and quality, inferences can be made about differences in how these two groups process information.

This study investigated the differences in the oral recalls of able and less able students. The findings have suggested that able and less able readers do not differ significantly in the quantity and quality of what they recall from their reading when it is at an independent or instructional level. From this finding it can be inferred that able and less able readers use similar processes when recalling what they have read. Both groups reconstruct meaning by bringing prior knowledge to the print in order to transform informational cues in text. If unaided, oral recall is a reflection of the comprehension process then it can be inferred that able and unable readers use similar processes when comprehending print.

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APPENDIX A

THE READING SELECTION ANALYSED INTO CLAUSAL UNITS

THE READING SELECTION

The Stranger and the Man Who Had No Luck[1]

This is a story of a man/ who had no luck at all;/ especially in hunting he had hard luck./ He became very thin;/ almost starved./ Still he tried his best to get something to survive./ This man had one child./ They were only living on fish;/ that was about all/ he could get. The only way (he could hunt these fish)/ was through the ice with hooks./ He had four hooks through the ice./ One day he told his wife,/ "I don't think/ I'll be able to finish visiting the four lines,/ because I'm very weak from hunger;/ it is a very cold wind."/ The woman got the tent straightened up and warm./ When the man started off to the lake to visit his first hook line,/ as he was scraping the snow off the ice,/ all of a sudden he saw somebody standing right beside him./ He told the man,/ "I don't think/ I'll be able to finish visiting these four lines/ because I am so hungry and cold;/ but anyway, I'll try to visit them all."/ He went to the next line,/ and the man followed him./ And the man stood beside him/ while he looked at the other one./ He didn't get anything there either./ He said the same thing again./ "I don't think/ I'll be able to finish visiting these four lines/ . . . I'll show you/ how hungry I am."/ And he pulled his coat at the neck/ and the other man saw/ that he was nothing but skin and bones./ And the man said,/ "Give me your chisel,/ I'll dig the hole for you."/ So, he gave his chisel to the stranger./ Very quick, the man made a hole

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[1]This passage was used by Cronin (1980) and was presented to the students without the title.

right through./ So, the men went to the other one and dug the hole,/ so the man could easily pull the line./ So they went to the last one, and started to dig./ But there was nothing at that hook either./

And the stranger (who was sitting there)/ had almost no clothes/—just two beaver skins/—while the skinny man had plenty of caribou skins./ And the man said,/"I'm surprised/ you can go in this cold with so little clothes."/ The stranger said,/ "Last year I had even less./ I just had one eagle skin./ Tomorrow you will visit these lines,/ and at the first one you will get a small one;/ that's for your child./ And at the third one you will get a bigger one;/ that is for your wife./ And at the last one you will get a big one;/ that's for you./ And you'll keep doing this everyday,/ until you are back in shape again./ So when you feel strong,/ then you can go around and hunt,/ but I am going to point to you the place/ where you will go first./ And there you will find fresh caribou tracks."/

He didn't really know who the stranger was./ And when the man blinked,/ the stranger suddenly disappeared./

So he did/ what the stranger said./ He got lots of fish./ He felt stronger and happier every day./ He was doing exactly what the stranger said./ The man visited the lines morning and evening./ He would go from the first to the last,/ then start from the last to the first./ And every time there was lots of fish./ Finally he was strong,/ and he thought,/ "Maybe I'm strong enough to walk around a little bit."/ He wasn't trying to hunt/—just going around for exercise./ So the next morning (after he finished visiting his

fish lines),/ he thought,/ "I might as well do/ what the stranger told me./ I'll go and visit this place/ that he pointed out."/ So he came to the place,/ and there he saw a herd of caribou/ and he started to chase them with his bow and arrow./

He saw the stranger by the caribou;/ then he saw/ that he had suddenly disappeared again./ That's/ how he killed the caribou/— as many as he was able to catch./ And from that day the man gained his life,/ and after that he had plenty of food./ He did what the stranger told him to do,/ and from that day he started to get normal again./

APPENDIX B

DESCRIPTION OF HOW THE DATA WERE CODED

DESCRIPTION OF HOW THE DATA WERE CODED

The following system for analysing recall protocols and for categorizing the recall units is given below and is quoted from - Fagan (in press).

Comprehension Categories

The following categories are based largely on the work of Drum and Lantaff (1977), earlier work by the author (Fagan, 1978, 1980) and on two research studies that tested the earlier category system (Brake, 1981; Beebe, Fagan and Malicky, 1981). Their purpose is to provide a structure to assess the degree of comprehension as indicated by a recall protocol. This may be achieved in four stages.

Stage 1: Eliminating Irrelevant Data

The first step is to isolate that information which will be analysed. In order to do this it is necessary to eliminate two categories of data: mazes and recall conventions.

1. Mazes may be either of four types.

Filled Pause (Audible Noise): This consists of sounds which may be represented as ah, er, um, etc.

Filled Pause (Interjection): This consists of words or phrases which seem to mark time for the speaker before going on to the next thought. Examples are well, I think, yes, let me see, wait a minute, etc.

Filled Pause (Repeat): This includes the repetition of words or parts of words.

He saw a golf - a golf cart.
The little girl was per - perturbed.

The words or word part spoken initially are classed as the Repetition since it is assumed that once the speaker repeats, he ends the pause and continues to complete the utterance.

Correction/Edit: This consists of a jumble of words preceding a change in direction of what the person was about to say, or preceding a better choice of words.

He wanted to sell - to buy the golfballs.
The boy collected golfballs in the - around where - where he - on the golf course near where he was lived.

There will be only one instance of a type of hesitation pause/ correction edit within a sequence. For example, if a word is

repeated six times, it is one instance of a Filled Pause (Repeat); if several words are used before the child gets back in the right track, this is one instance of a Correction/Edit.

2. Recall conventions are concerned more about the narrating than with the actual content of the text. They may express a reader's limitations in not being able to remember or may include vague generalizations which appear to be a cover-up for lack of specific knowledge. Following are examples of recall conventions.

Text: (no specific referents)

Protocol: "Well it says that . . ."
"And in the second paragraph the story says . . ."
"That's all I can remember."

Protocol: "That was a good story."
"I found it hard to remember the part where all the characters were introduced."

Also included are phrases used by the reader to insert an event in proper sequence due to forgetting while recalling.

Protocol: Before that he set out his hooks for fishing.
(The "before that" acts as an addendum to insert information in its proper sequence after subsequent information had been recalled. A synonymous statement to "before that" would be "I forgot that."

Text: (detailing the advantages of heat)

Protocol: Heat helps lots.

Text: (describing the manufacture of various items of clothing)

Protocol: They make dresses and stuff like that.

Stage 2: Choosing a Unit for Analysis

Different units may be chosen for analysis—proposition (Kintsch, 1974), syntactic proposition (Fagan, 1978), clause or t-unit (Hunt, 1965). An assumption made when choosing a unit is that this represents a meaningful division of information and that the reader may perceive this unit when comprehending and/or recalling information. Since it cannot be determined with definitiveness which unit operates in this manner (in fact it is likely that different units may be processed at different times), the unit chosen for analysis will have different implications when interpreting the results obtained. For example, if the smallest unit is chosen—the syntactic proposition—then it is easier to determine if this fits into a category since verbatimness, synonym etc. is easier to analyse within this smaller

unit than within a larger unit such as the t-unit. Consequently the interpretation of results would be weighted in terms of this category. If, on the other hand, the t-unit is chosen, then it is easier to judge if a summary has taken place since it is difficult to provide a summary of information within the brevity of the syntactic proposition. The clause unit is intermediate in length between the syntactic proposition and the t-unit/incomplete t-unit, and whereas it may not have the full advantages of either of these, it also does not have their full disadvantages.

In order to isolate clauses, it is suggested that the protocol first be divided into t-units and incomplete t-units (Fagan, 1978) which are defined as follows:

T-unit: This is a single independent prediction (main clause) together with any subordinate clauses that may be grammatically related to it. It may be a single or a complex sentence, but not a compound sentence.

In dividing a passage into t-units, one approach is to consider you are editing the transcript and are directed to rewrite as sentences according to the definition above. Where there is a compound sentence, divide before the connecting conjunction (and, but, etc.) and begin the next sentence with the conjunction. Do not change any words, but bracket these words which do not fit into the regular flow of language that make up the t-units (i.e., mazes).

Further guidelines for segmenting t-units are:

1. When a quote consists of more than one principal clause, only the first one is included with the words that identify the speaker.

   e.g. /Christopher said uncle when shall we get there/ it's such a long walk/

2. Having a t-unit within a t-unit is possible.

   e.g. /and he (/now he was scared/) told the captain . . .

3. When the meaning of a passage indicates that a subordinate conjunction has been omitted, the clause involved does not form a new t-unit.

   e.g. /he decided that he should go cause there was nobody around and (cause) there was stuff . . .?

4. "Yes" is included in the succeeding t-unit if the following statement is an elaboration of the answer; otherwise, it is considered to be an incomplete t-unit.

   e.g. /yes I guess you missed . . ./

   /yes/ what do you want it for/

5. Intonation may determine the location of the boundary when a phrase, structurally, can be attached to either the preceding or subsequent t-unit.

   e.g. "I think" as in:
   /he went I think/ he said he planned to any way/

6. Expressions like "I think," "I believe" are considered part of the t-unit if they are integral to the statement as for example:

   /I think he went said John/

   If the expression appears to be idiosyntactic to the speaker, the words are considered a "holder" type maze and are not counted as part of the t-unit.

   e.g. /Floods cause much damage/ (I think)

Incomplete t-unit: This consists of a group of words which do not form a complete independent clause but which are necessary to the ongoing flow of language. Since it does not form a complete independent clause, it is different from a t-unit. It may be lacking a subject, a verb, object, or complement, or any combination of these.

The incomplete appears to serve either of four functions: specifying particular information; elaboration of an antecedent; making additional comments on a topic; or establishing a referent for an ambiguous item.

He pushed one guy down in the water, pushed him on the ground, started punching him.

So he got fed up with this kind of deal, everyone chasing him.

And so the man is looking, couldn't find him.

He'd sell it to them, the balls.

An analysis of a transcription is given below.

He asks them for four golf balls//or he's gonna put his books into the river//(and, and) (um) (he gave them) //the boy gave them four (four) (um) golf balls//they drop his boots anyway/because they are mean//he goes back looking for them//goes home (because after) (um)//he had a dream// . . .

T-units //	6
Incomplete t-unit ___ .	1
Filled Pause (Audible noise)	3
Filled Pause (Repeat)	2
Correction/Edit	2
Clauses ../ and .//	7

Stage 3: Comprehension Categories

A. Text Exact

This category includes information from the text in its exact form or with minimal variations. It is assumed that this information was stored in rote fashion or is automatically constrained by other information and is "reproduced" in a similar state.

A1. Verbatim Recall

The information is a direct recall of the lexical terms of the text.

Text: The boys were late for school.

Protocol: The boys were late for school.

Substitution of a determiner, a verb form or a function word which does not change the meaning of the unit will also be placed in this category.

Text: He chased the animal.

Protocol. He chased an animal.

Text: People are waiting at the door.

Protocol: People were waiting by the door.

Text: The student had been absent many times.

Protocol: The student was absent many times.

A2. Partial Recall

A significant concept(s) (nouns, verb, attribute) is/are omitted in the verbatim recall.

Text: After robbing the store, the convicts raced for their car.

Protocol: The convicts raced for their car.

Text: The children had never seen such a tiny colt.

Protocol: The children had never seen such a colt.

This category would also include fragmented units which are not mazes and although not semantically complete do indicate that the reader has noted and attempted to retrieve concepts which continue the story line.

Text: The stranger told him to follow his advice and put his lines at the spot indicated.

Protocol: The stranger told him . . . that he would put . . . all his lines . . .

B. Text Specific

In this category is placed information recalled that has specific references in the text. The reader may have "transformed" some of this information by reordering or substituting lexical items.

B1. Substitution of Pronouns

A pronoun is used in place of a noun when the noun referent is present elsewhere within the text. All other items in the unit are verbatim.

Text: People were very kind to the stranger.

Protocol: They were very kind to the stranger.

Text: The truck went off the road about one half mile from the settlement.

Protocol: It went off the road about one half mile from the settlement.

B2. Synonymy of Elements

The operational definition of synonymy is context dependent and may refer to (a) substitution of one word for another so that semantic and grammatical features are preserved, (b) the sequencing of lexical items from a unit such as the preposing of prepositional phrases or substituting an active for a passive, and (c) a paraphrase of the original unit which in the subjective opinion of the scorer has the same conceptual referents and has definite correlations in the text unit.

Text: fish

Protocol: salmon

Text: The house was on fire.

Protocol: The house was burning.

Text: In two and very slowly the mourners walked in procession.

Protocol: The mourners walked in procession very slowly and in twos.

Text: He said good night and went to bed.

Protocol: He decided to call it an evening and said good night.

C. Text Entailed

The information retrieved is (a) a paraphrase of or synonymous with the information input, but the unit of recall includes information from more than one unit of input, or (b) a superordinate statement subsuming information from more than one text unit. It may be assumed that at the time of comprehending the reader "constructed" information and may still "transform" it at the point of recall.

C1. Synthesis

A synthesis statement is (i) a compilation of at least two units of information. It may not contain either of the specific units summarized but may be expressed in a hierarchial or superordinate category or by a label generalizing the events summarized, such as a main idea, theme, or moral.

Text: He quickly raced to the landing, stripped off his clothes and jumped into the icy water to rescue the frightened little boy.

Protocol: He did a very brave deed.

Text: While visiting her Aunt Lizzie at the farm last weekend, Teri helped harvest some carrots, peas, zucchini and tomatoes.

Protocol: Last weekend, Teri helped her Aunt harvest some vegetables.

C2. Summary

A statement is a summary if it relates information from at least two units in the text in an embedded form, that is some of the lexical items or units of information are deleted during this process. In summarizing the exact words or their synonyms may be used.

Text: She jumped into the icy water. She was trying to save the swimmer who was in trouble.

Protocol: She jumped into the icy water to save swimmer in trouble.

Text: The stranger pitied the man. He had tried to help but had not been very successful. The stranger felt deep remorse but knew that the man would have to settle his own problems

without outside interference. The stranger stared quietly as the man walked slowly away.

Protocol: The stranger pitied the man who walked slowly away.

D. Text Experiential

This information is added by the reader to fill in gaps in the text data. The reader is "reconstructing" information based on prior knowledge which may be of world events such as rodeo, or from having read or listened to other texts.

D1. Inference

An inference may include either a logical reasoning or an instantiation, that is, the filling in of information suggested by the text information but not specified. The latter is often referred to as a pragmatic inference and may be stated in a contradictory form and still make a plausible statement.

Text: John and Bill left for school at the same time and walked at the same rate. But Bill lived several blocks farther away from the school than John. John just reached the school on time. He hoped that Bill would still be able to play ball that evening.

Protocol: (Logical): Bill was late for school.

Text: The mother bundled the children in their parkas, scarves and mittens. She was sure they all had a hot lunch as they left for school.

Protocol: (Pragmatic): It was a cold day.
(Contradiction: It was not a cold day. Perhaps the mother was mentally deranged.)

D2. Case Related Information

This includes the expansion of permissible sequences that are assumed extensions of a unit of information in the text. This subcategory describes appropriate prior knowledge of similar content.

Text: Ground corn.

Protocol: Ground corn with a rock.

Text: The captain climbed the mast of the distressed ship and signalled for help.

Protocol: The captain climbed the mast of the distressed ship and signalled for help with his flag.

Text: Used for etching.

Protocol: Used for the etching of drawings.

D3. Experiential Intrusions

This information is related to the theme of the text passage but is not specifically suggested by a particular unit in the text. It does not convey the text information but is an addition of information from the reader's background.

Text: The little boy had disobeyed his mother. She had told him to wait by the car while she went back to the store for the other bag of groceries. Now she could not find him anywhere.

Protocol: One time I saw this woman looking everywhere for her little boy. He went up the escalator when she wasn't looking.

D4. Storyline Additions

These units include additions to the information within the storyline. The origin of these additions appears to be based on the reader's experience with stories and the kinds of goals or actions which are appropriate in a particular context and thus are predictable from the story information. Also included are expressions that indicate saying, thinking, etc. which are not specifically stated in the text. These are not inference since they are not immediately constrained by a specific part of the text.

Text: (describing a character's actions that led up to making a decision.)

Protocol: He thought he would catch the next train and finally settle the matter completely.

Text: The stranger saw that the man was weak and finally dug a hole through the ice for him.

Protocol: The man said "I am not able to dig the hole." But the stranger said "You got to keep trying and trying." The man said "I just can't do it."

E. Text Erroneous

These errors constitute memory errors or are due to lack of attention to the text. The appropriate slot is there but is inaccurately filled.

E1. Errors in dates and proper names

These errors constitute memory errors or are due to lack of attention to the text. The appropriate slot is there but is inaccurately filled.

Text: Sir Wilfred Laurier

Protocol: Sir Wilfred Bennett

Text: 1864

Protocol: 1972

E2. Erroneous expansions/additions

These units (i) separate attribute/argument phrases into units that are conceptually wrong, (ii) expand a unit of information in an erroneous way (D2), or add information that is incorrect in terms of world knowledge of the events mentioned, or is contradictory with information in the text. These may be due to lack of experience with the content and/or the ambiguity of the text.

Text: They ground corn.

Protocol: They ground corn by heating it.

Text: The lobster's claws.

Protocol: The lobster claws.

E3. Inaccurate/incorrect synthesis

Information from different units of the text is (i) designated by an inaccurate superordinate referent, or (ii) is generalized in a way which does not convey the gist of the passage.

Text: We shouldn't always knock computers when they seem to make an error on our accounts. Granted we might be upset when our balance is nil and the computer still insists that we send a check for $40.00. However, if computers were assigned to do the many menial tasks of administrative affairs and leave more time for humans to use their intelligence to solve the more significant problems, then computers and humans would be compatible and would coexist in harmony.

Protocol: Computers are frustrating.

Text: While visiting her Aunt Lizzie at the farm last weekend, Teri helped harvest some carrots, peas, zucchini, and tomatoes.

Protocol: Last weekend Teri helped her Aunt harvest some fruit.

E4. Inaccurate/incorrect summary

In combining information the reader confuses information about a particular referent.

Text: As the man was scraping snow off the ice he saw someone standing beside him. The man said to the stranger "I don't think I can finish visiting my lines because I am so cold and hungry." The stranger said he would help. He dug new holes for the man and also showed him where to get caribou.

Protocol: A stranger came along. He helped the man dig holes through the ice and then they saw a caribou herd go by.

Text: Mrs. Gray sat down to watch the TV announcer on her weekly show about gardening.

Protocol: Mrs. Gray sat down to watch the TV announcer on his weekly show about gardening.

Text: The dogs lay down and refused to move. The man dragged the sled all the way to the cabin.

Protocol: The dogs dragged the sled to the cabin.

E5. Faulty Inference

The reader draws an incorrect inference from the information given in the text.

Text: Mrs. Gray knew it was two o'clock because she could hear Henry, her parrot squawking. He wanted to watch his favorite TV program. But Mrs. Gray thought that too much TV was bad for Henry's eyes so she told him to rest instead. He squawked even louder so she finally turned on the TV set. After Henry's show was over, she stayed to watch a show on cooking.

Protocol: Mrs. Gray came in from the garden to watch her TV show.

Stage 4: Weighting

The matter of assigning a weight in points to the unit chosen is an arbitrary decision and should be determined by the purpose of the analysis.

It is suggested that the weighting be assigned on the basis of the number of categories evident in the reader's recall as opposed to the number of units recalled. That is, one unit may be assigned to two categories. The rationalization for this is that the analysis

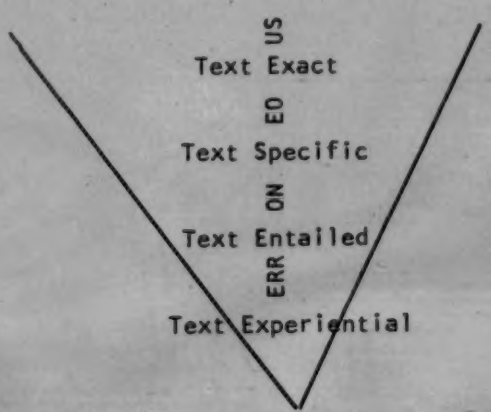
is hopefully indicative of what the reader was doing when reading. Consequently if one unit (clause) indicates that the reader uses a Pronoun Substitution (B1) and Case Related Information (D2), then this should be noted.

An incomplete t-unit is sometimes not a clause (lacks a finite subject or verb) but is considered equivalent to a clause unit for scoring purposes.

Validity and Reliability

The comprehension categories have been based on the construct of reading comprehension (as measured by a recall) as involving the reception and production of information which is generated from an interaction of the text data and the reader's prior knowledge. As indicated in the description of the categories, certain assumptions about the underlying processes that may contribute to that category are made based on the work of Kintsch and Van Dijk (1978).

The categories may be sequenced in terms of the proportion of test data and prior knowledge that may have contributed to the recall. This sequence may be illustrated by the following diagram with the amount of text decreasing from text exact to text experiential.



In order to obtain adequate reliability, the following guidelines are suggested:

1. Each scorer be thoroughly familiar with the categories, their definitions, and examples.

2. A number of protocols be scored as points for discussion before the independent scoring is done. At this point, definitions or examples may need to be further clarified.

3. If a unit is not readily assigned to a category, then the scorer should engage in the process of category elimination.

4. Posing a question on the unit being analysed may help clarify the category which represents what the reader was doing. For example, if the unit supposedly indicates Text Verbatim, then an appropriate question for the reader is "Tell me if this was present in what you just read." If the unit is suspected as being Case Related Information, then a question might be "Is this true about grinding corn? Do they pound it with a stone?" For an inference the question posed might be "What information in the story suggests this statement (the inference)?" For a synthesis, the question "Can you elaborate on this?" might be considered. The scorer will have to judge whether or not the reader could respond to such questions. If so, then it is plausible that this unit belongs within the category indicated.

Using the above guidelines, five recall protocols comprising 187 clauses were assigned to categories. The interrater reliability in terms of percentage agreement was:

Category A	98.5
Category B	97
Category C	93
Category D	96
Category E	95

Concluding Statement

In order to assess comprehension, one must consider both the process (reception and production) and the product. It is difficult to get at the former which must be inferred. The comprehension categories provided in this article hopefully will allow both factors to be taken into account.

APPENDIX C

SAMPLE OF AN ANALYSED RECALL PROTOCOL

B 1 B 2
(Well) it's about a man/ who doesn't have much luck at all./

C 3 D 4
He has a wife and one child/ and they're (uh) all really skinny/

B 5 C 6
and he has four lines in the water/ which he uses to catch fish/

B 7 B 8
and one day he says to his wife/ that he doesn't think/ he'll be

C 9 B 10
strong enough to go and look at all four of them/ but he goes anyway/

B 11 D 12
and he looks at the first one/ and then he looks up/ and there's a

C 13 B 14
stranger standing beside him/ and he says to the stranger/ (I don't

A 15
think I'll be able to look at all these because) "I don't think/

B 16 D B
I'll be able to look at all these four/ 'cause I'm so tired and

17 B 18 B 19
hungry"/ and he goes to the second one/ and he says the same thing/

B 20 D 21
and he looks at it/ and the stranger doesn't say anything really/

B 22
and then (he goes, "Give me your chisel") the stranger goes/

A 23 C 24
"Give me your chisel."/ And he goes and looks in the other two/

(and the . . .) at the second hole (I forgot to tell you) The man

C 25 B 26
showed the stranger/ how skinny he was/ (and then . . .)then the

B 27 C 28 C
stranger told the man/ that there was a way/ that he could get lots

29 C 30
of fish/ on one hole there would be a small fish for his child./

E C 31 E
The next hole there'd be a larger fish for his wife/ and the third

C 32 B 33
hole there's be a large fish for him/ that would keep happening/

B 34 D 35 B 36
until they were back to normal/ and he said/ "and when that's done/

B 37 B 38 C 39
when you're normal/ and you think/ you're strong enough to go hunting/

B 40 D 41
then you'll find caribou tracks/ and you'll get the caribou"/ so the

C
stranger showed the man (where the . . .) what order to go to the

42 B 43
holes/ and where he would find the caribou tracks/ so the man went to

C 44 B 45 D
these holes everyday/ and he was getting back to normal/ and one day he

46 C 47
went/ and he decided to look for the caribou tracks/ where the stranger

C 48 B
told him to look for the caribou tracks./ There he found a herd of

49 B 50 B
caribou/ and the stranger was standing by one caribou/ and when he

51 B 52
blinked/ the stranger was gone/ (and that's how he killed them

E 53
all . . . uh . . .) Then he killed most of the caribou/ and from then

B 54 B 55 B 56
on he kept getting normal/ he kept doing/ what the stranger said./

(Subject from the able reader group.)

Clauses: 56

Recall Categories*

A - Text Exact	2
B - Text Specific	31
C - Text Entailed	16
D - Text Experiential	7
E - Text Erroneous	3
	59

*Some clauses were assigned to two categories.